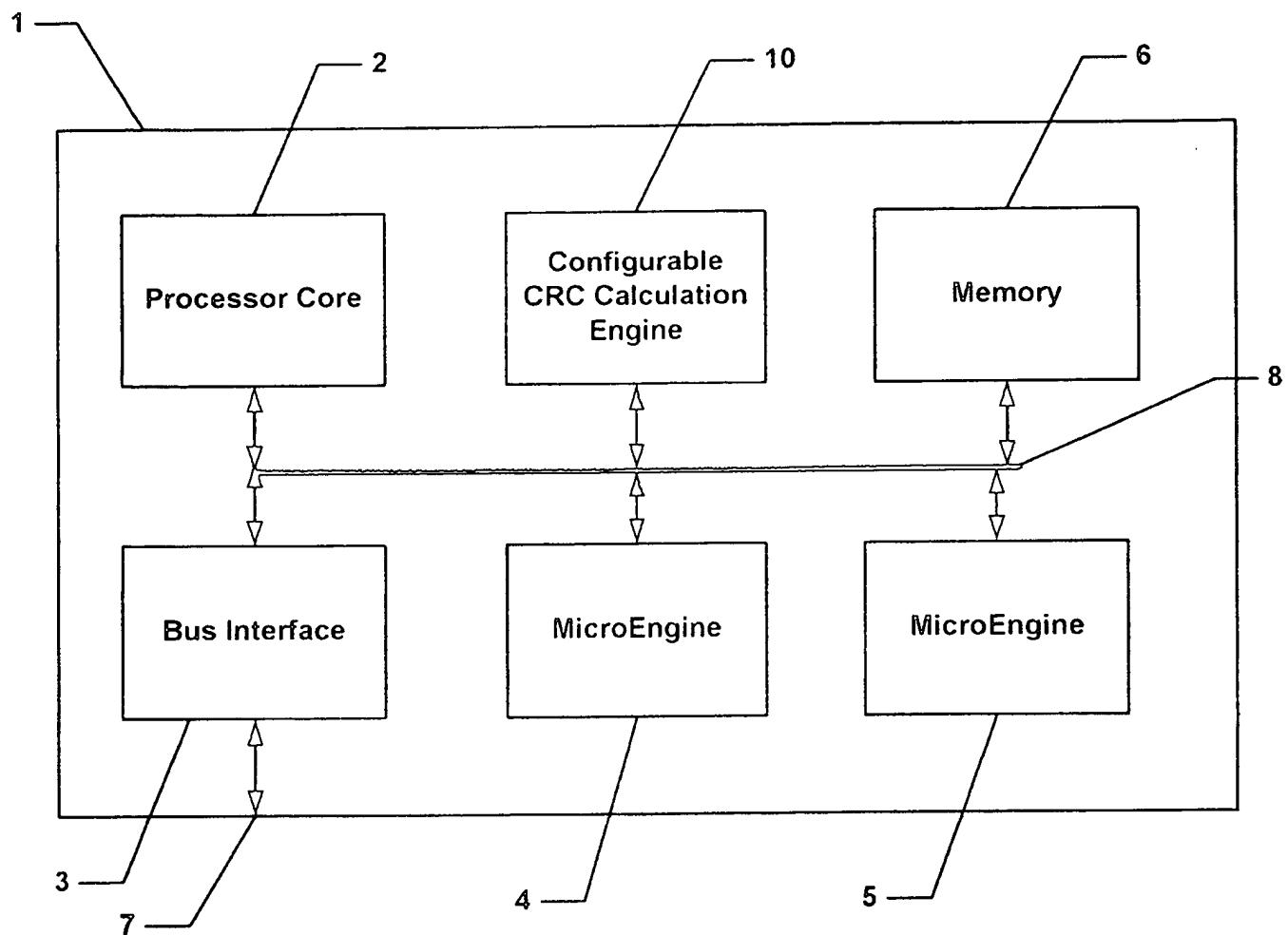Title: Method and Apparatus for Calculating CRC on Data Using a
          Programmable CRC Engine
In re Patent Application of: Jaroslaw J. Sydir et al.
Docket No.: Intel-015PUS
Sheet 1 of 9

Figure 1

Title: Method and Apparatus for Calculating CRC on Data Using a
          Programmable CRC Engine
In re Patent Application of: Jaroslaw J. Sydir et al.
Docket No.: Intel-015PUS
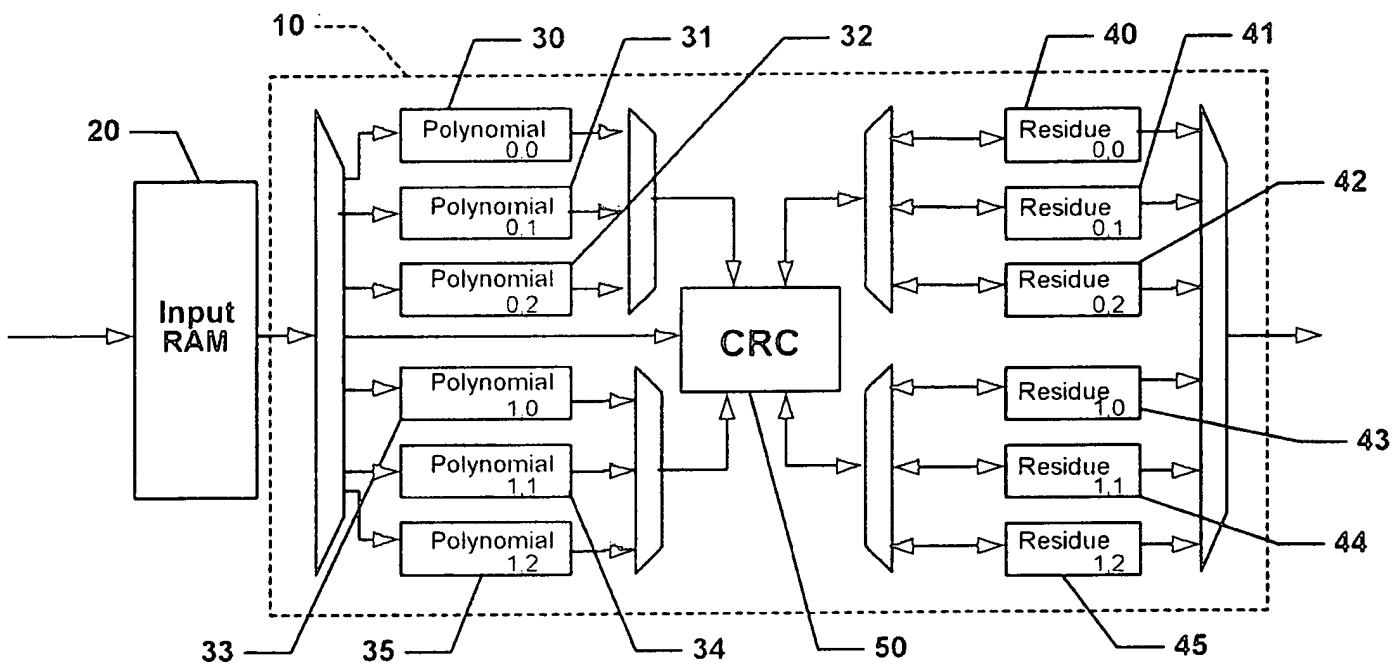Sheet 2 of 9

Figure 2

Title: Method and Apparatus for Calculating CRC on Data Using a
         Programmable CRC Engine
In re Patent Application of: Jaroslaw J. Sydir et al.
Docket No.: Intel-015PUS
Sheet 3 of 9

100

START

110 — Load polynomial into appropriate context

120 — Load block of packet data

130 — Load residue

140 — Calculate CRC value for block, store residue

150 — Remaining blocks of data for the packet?

YES

160 — Load next block of packet data

170 — Calculate CRC value for block using stored residue

NO

180 — Read residue from context

END

FIGURE 3

Title: Method and Apparatus for Calculating CRC on Data Using a
         Programmable CRC Engine
In re Patent Application of: Jaroslaw J. Sydir et al.
Docket No.: Intel-015PUS
Sheet 4 of 9

200

203

Single Data Bit Processor

204

Single Data Bit Processor

205

Single Data Bit Processor

206

Single Data Bit Processor

207

Single Data Bit Processor

208

Single Data Bit Processor

209

Single Data Bit Processor

210

Single Data Bit Processor

211

Remainder (CRC)

202

CRC Polynomial

201

Input Data

0
1
2
3
4
5
6
7

Figure 4

Title: Method and Apparatus for Calculating CRC on Data Using a
         Programmable CRC Engine
In re Patent Application of: Jaroslaw J. Sydir et al.
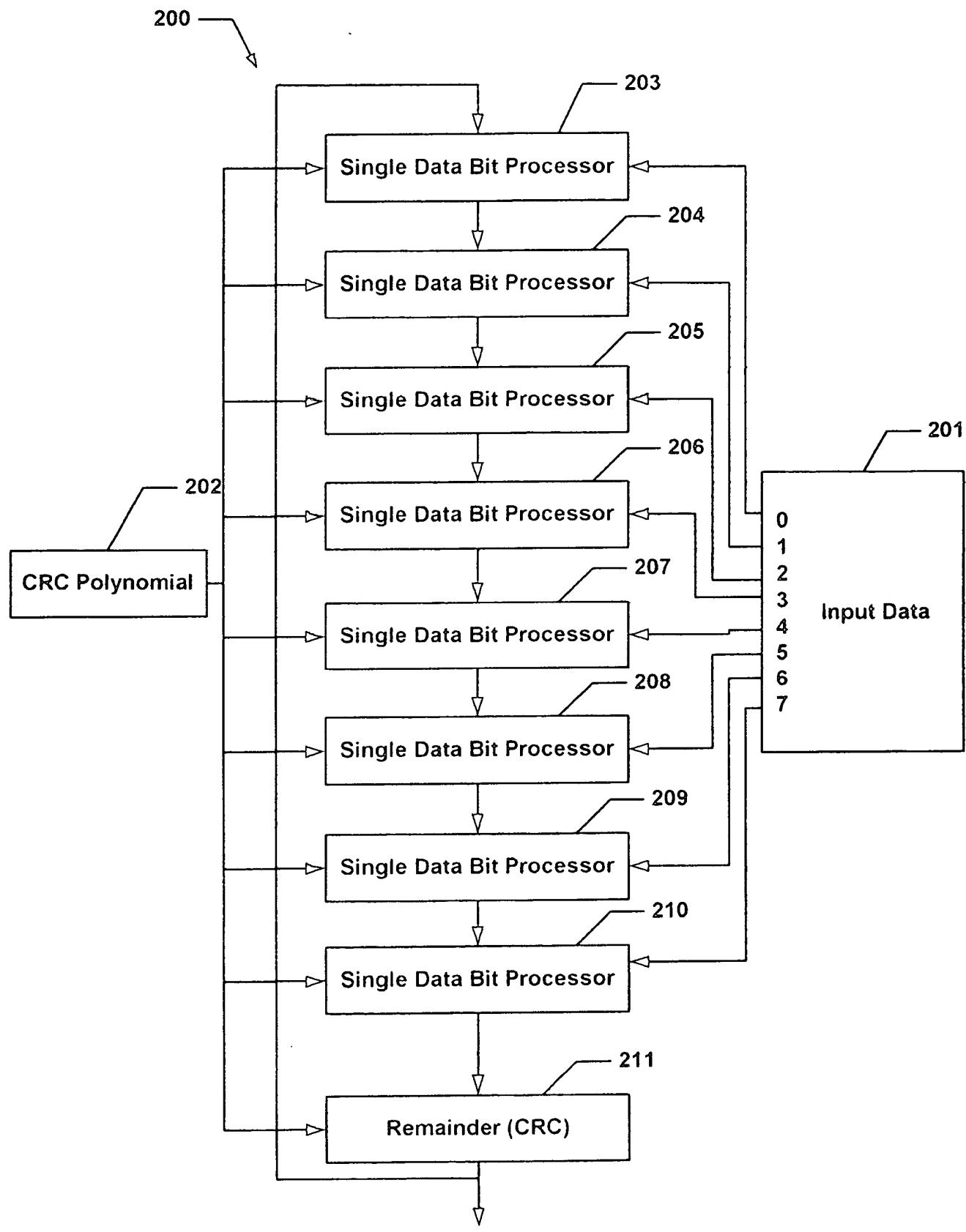Docket No.: Intel-015PUS
Sheet 5 of 9

300 —

START

310 — Left shift any previous remainder by 1 bit position

320 — XOR the shifted remainder with the Polynomial

330 — XOR the data bit with the MSB of the remainder

340 — Select the final remainder

END

FIGURE 5

Title: Method and Apparatus for Calculating CRC on Data Using a
           Programmable CRC Engine
In re Patent Application of: Jaroslaw J. Sydir et al.
Docket No.: Intel-015PUS
Sheet 6 of 9

Figure 6A

Title: Method and Apparatus for Calculating CRC on Data Using a
          Programmable CRC Engine
In re Patent Application of: Jaroslaw J. Sydir et al.
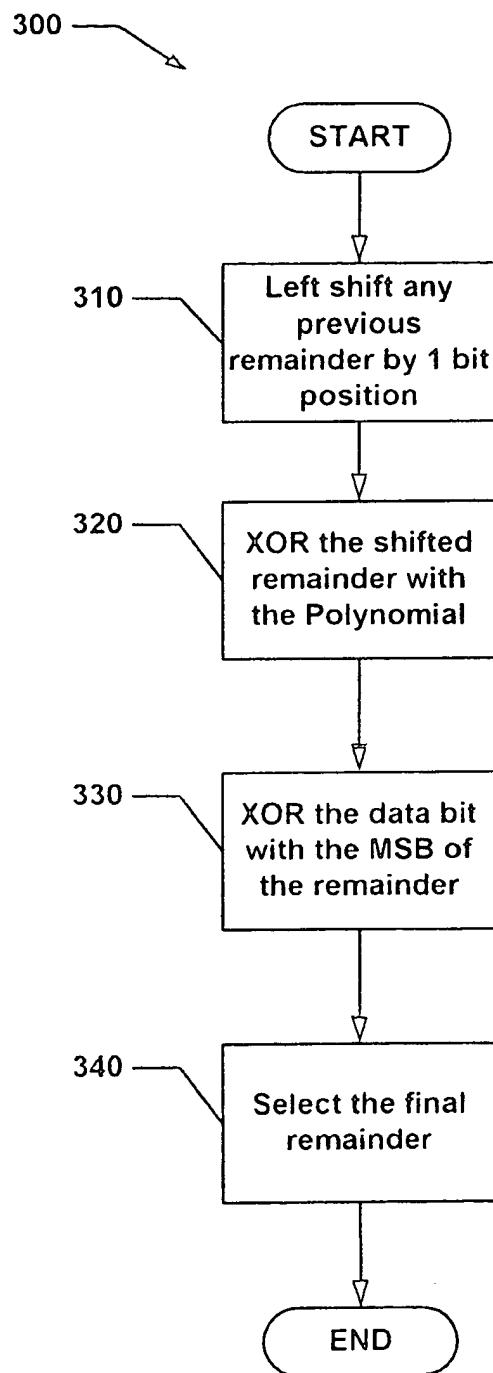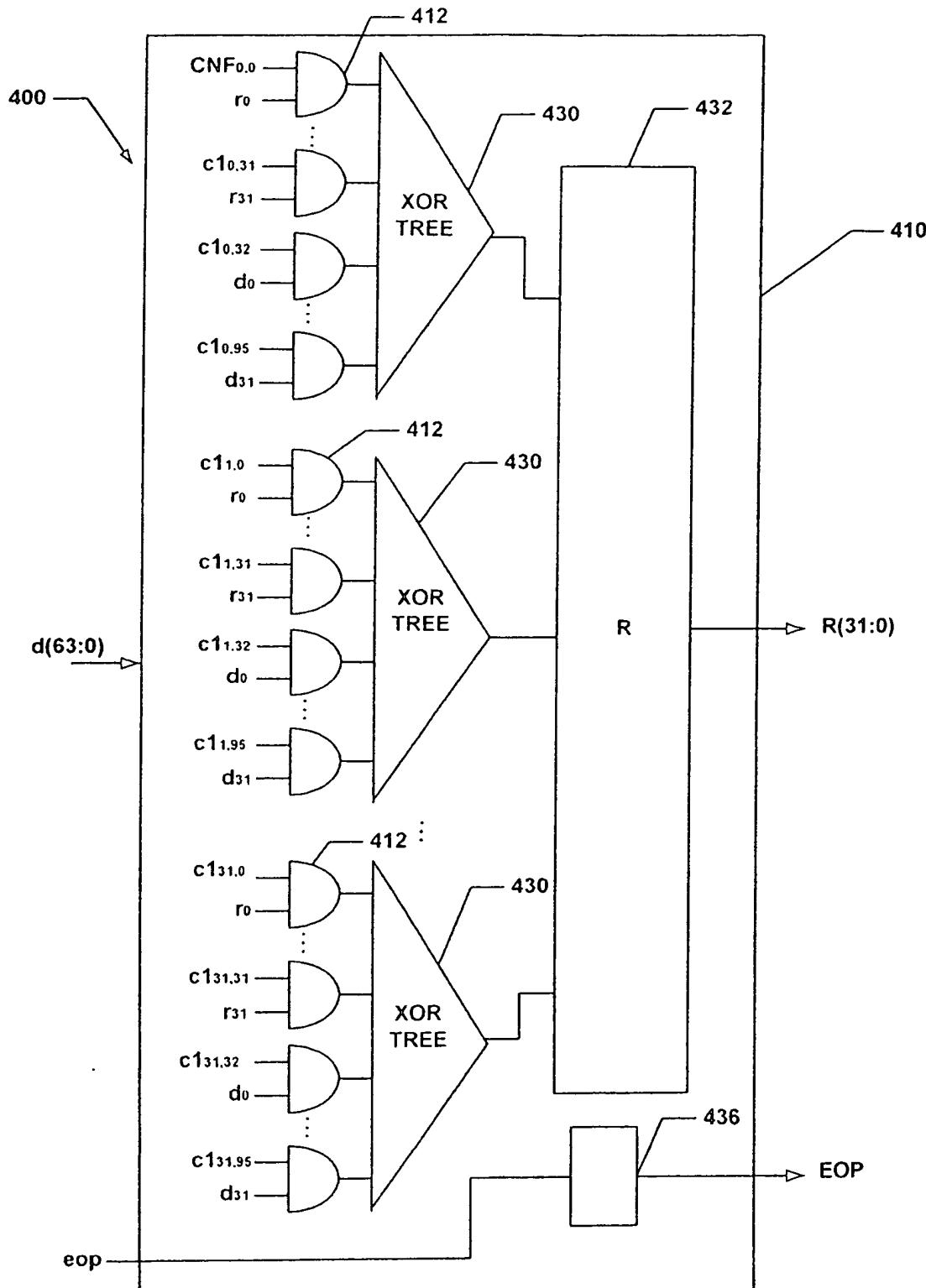Docket No.: Intel-015PUS
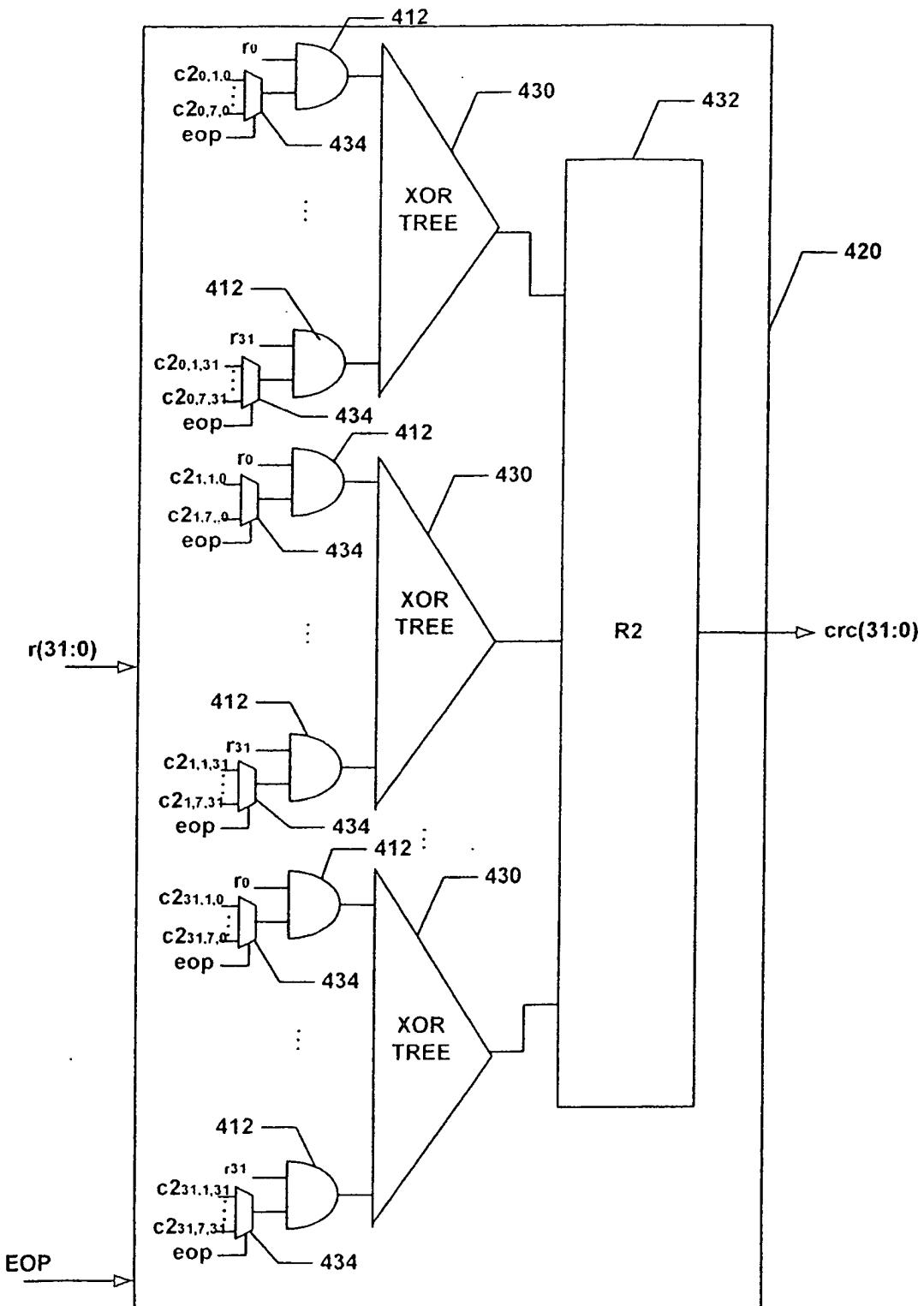Sheet 7 of 9

Figure 6B

Title: Method and Apparatus for Calculating CRC on Data Using a
          Programmable CRC Engine
In re Patent Application of: Jaroslaw J. Sydir et al.
Docket No.: Intel-015PUS
Sheet 8 of 9

500 —

$$g(x) = 1 + g1 \cdot x + g2 \cdot x^2 + \ldots + x^n$$

530 — g1   g2 — 532

R_0 + R_1 + R_2 --- R_{n-1} +

510 520 512 522 514 516 din

540 —

$$g(x) = 1 + x + x^3$$

520

R_0 + R_1 R_2 +

510 512 din 514 524

PRIOR ART

FIGURE 7A

550 —

3

Function
implementing
the Equation   3   R
for each bit of
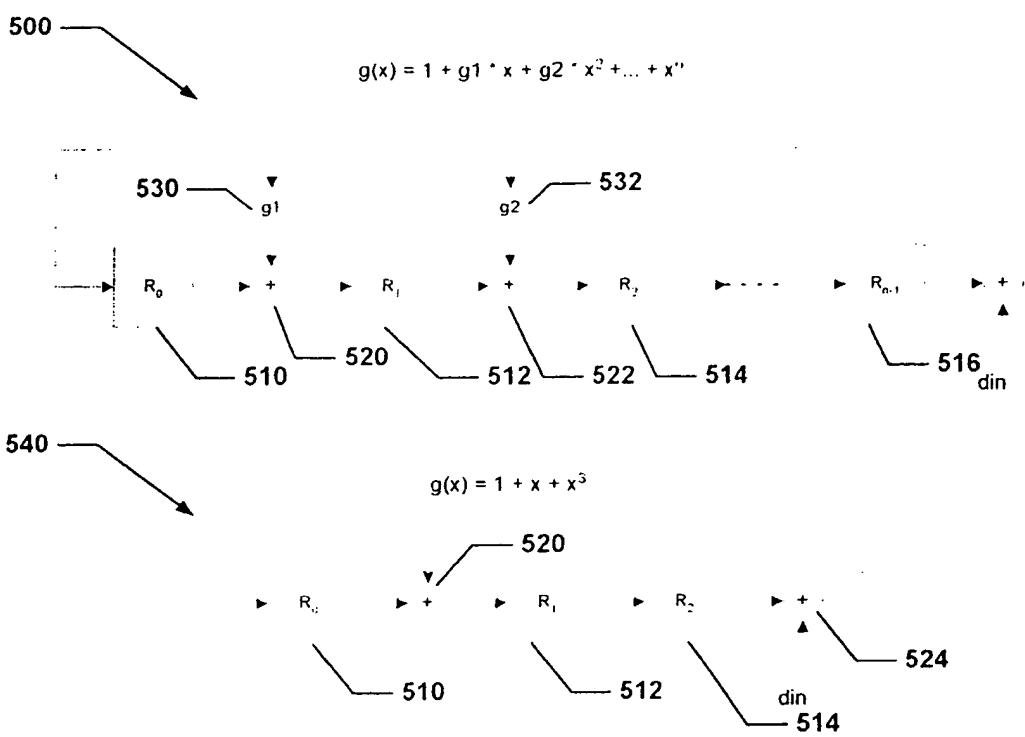R

din   4

PRIOR ART

FIGURE 7B

Title: Method and Apparatus for Calculating CRC on Data Using a
          Programmable CRC Engine
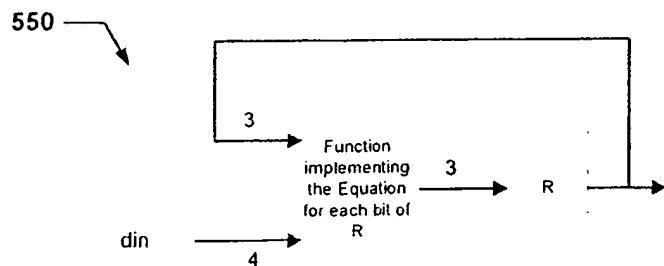In re Patent Application of: Jaroslaw J. Sydir et al.
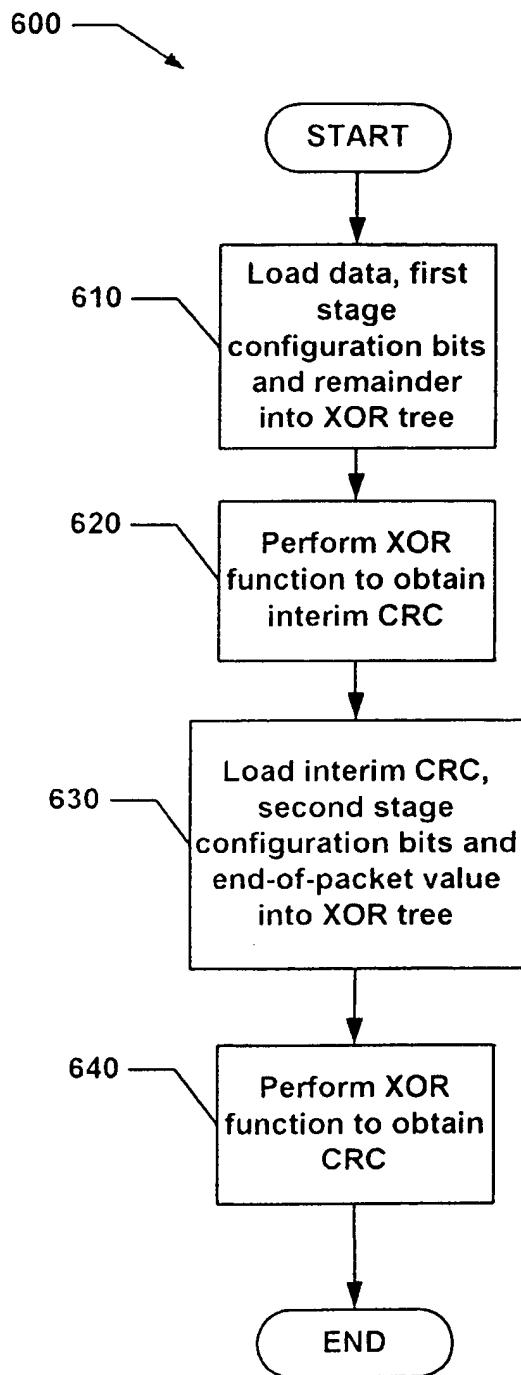Docket No.: Intel-015PUS
Sheet 9 of 9

600 ——

```
          ┌───────────┐
          │   START   │
          └───────────┘
                │
                ▼
        ┌─────────────────┐
        │ Load data, first│
610 ──  │      stage      │
        │configuration bits│
        │  and remainder  │
        │  into XOR tree  │
        └─────────────────┘
                │
                ▼
        ┌─────────────────┐
        │  Perform XOR    │
620 ──  │function to obtain│
        │  interim CRC    │
        └─────────────────┘
                │
                ▼
        ┌─────────────────┐
        │Load interim CRC,│
        │   second stage  │
630 ──  │configuration bits and│
        │ end-of-packet value │
        │   into XOR tree │
        └─────────────────┘
                │
                ▼
        ┌─────────────────┐
        │  Perform XOR    │
640 ──  │function to obtain│
        │       CRC       │
        └─────────────────┘
                │
                ▼
          ┌───────────┐
          │    END    │
          └───────────┘
```

FIGURE 8